

*Dannevig*

## MARKING EXPERIMENTS ON THE ARCTIC COD.

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Introduction.

The cod tagging experiments carried out by Dannevig (1953) during the years 1947 - 1953 showed that the type of tag, the method of attachment, and the position of the tag on the fish had a considerable effect on the number of returns. The hydrostatic tags attached by nylon to the neck, had many advantages preferably to metal clips, ebonite or plastic discs. As a consequence of Dannevig's conclusions the Institute of Marine Research in Bergen has since 1953 used hydrostatic tags only, both in Lofoten and in the Barents Sea. However, in the last years three important questions have been arisen: 1) Is the visibility of the tags satisfactory? 2) Are all tags returned by the fishermen? 3) Do all the fish survive the tagging?

Visibility of tags.

Several tags were not discovered until the fish had reached the processing stage, or the consumer (table 1). The information regarding these tags are usually poor, and it seems that many of the tags discovered long time after the capture of the fish are not returned. The finder is probably of the opinion that the tags with insufficient information are of no value.

In the autumn, 1955 it was tried to make the hydrostatic tag more visible by attaching a yellow alcatheene flag. Some cod taken by trawl were tagged in the Barents Sea from the 17th of October to the 2nd of November. A total number of 473 cods were tagged with flagged and 476 with ordinary hydrostatic tags. The length distributions of the two groups were about the same, and the chances of survival might have been the same because the cod were tagged alternatively with flagged and ordinary hydrostatic tags. Till now a total number of 69 flagged and 64 unflagged tags have been returned (table 2), the figures for the first year being 40 and 30 respectively. This difference is mainly due to the fact that more flagged

tags were returned during the first three months after the release of the fish. In the later months there has been an insignificant difference between the numbers of the flagged and the unflagged returns.

The experiments with flagged tags were continued in Lofoten during the spring, 1956. From a number of purse seine catches 464 cods were tagged with flagged and 467 with ordinary tags. Till now 260 flagged and 246 unflagged tags have been returned (table 3). The figures for the first year after release being 217 and 208 respectively.

These two experiments indicate that the flag might have influenced the visibility of the hydrostatic tags, but the flagged tags are probably shedded to a greater extent. It may be possible that some of the flags may fall off. However, the total difference between the flagged and the unflagged returns is so small that the problems of making the hydrostatic tags more visible has remained unsolved.

#### Survival of tagged fish.

In the autumn, 1956 a number of cods taken in the Barents Sea by trawl were tagged to get information as to the survival of the cod immediately after release. On the 2nd and 3rd of October a total number of 511 cods from 7 hauls were tagged at East Skolpen Bank. The variation of the speed, the duration and the depth of the hauls were insignificant, but the number of cods in the catches ranged from 24 to 454. The catch of other species was negligible.

Fig. 1 shows the connection between the return percentage and the numbers of cod tagged calculated as a percentage of the total catch for individual hauls. This figure indicates that the percentage of returns was smaller, when a greater part of the catch was tagged. The reason may be a smaller survival for the population of tagged fish taken from smaller catches, than from bigger ones.

Before going further into this question, it may be of value to consider the handling of the fish until they are released. The most lively fishes from the cod end are put into a tank of running water. Floating and wounded fishes are rejected before the tagging is started.

During the summer, 1958 Sætersdal and Møller carried out five

experiments in the Barents Sea to provide some information whether the time spent in the tank influence the percentage of fish suitable for tagging. The time spent in the tank varied from 10.5 to 101.5 hours. Fig. 2 shows the decrease in the number of living fish in proportion to the time spent in the tank. The number of living fish in three of the experiments dropped by 18 to 20 per cent in the course of the first 6 or 7 hours. The curve representing the experiment carried out on the 18th to the 22nd of July has not been carried back to 0 hours. This is due to the fact that the number of fish removed from the tank after one hour, was not noted. However, the decrease between 2 and 4 hours was 14.3 per cent. The experiment made on the 22nd to 24th of July deviated slightly from the others, as all the 11 fish put into the tank, after 40 hours were in good condition. Those fish which were still alive at the end of these experiments had no wounds or visible abrasions at all. They were lively and difficult to tag.

According to Beverton et al. (1958) it seems that the scale condition of the fish has some effect on the return percentage. It is often difficult to determine the scale condition of the fish, but the experiments made during this summer indicate that it is possible to discover and reject fish with poor scale condition or other defects after staying for some hours in a tagging tank. It is too early to say anything definite about how long time we are going to keep the fish in the tank, but the experiments indicate that the fish should be left in the tank rather longer than has been customary.

The conclusion to be drawn from these experiments is that it appears to be of little value to continue tagging experiments on a large scale as long as so little is known of the survival of the tagged fish immediately after release. Instead, an attempt should be made to study the damage suffered by the fish prior to tagging, and to determine whether there is any possibility of reducing the extent of this damage. Other problems are to discover the best characters of lively fishes and to determine the survival of the tagged fish after release.

References.

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Table 1. The spring 1955 Barents Sea releases.

Total numbers of tag returned.

Gears	Tags found			
	by fishermen	under processing	by consumers	?
Trawl	135	4	20	14
Other	50	2		
?	5	3		

Table 2. The autumn 1956 Barents Sea releases.

Numbers of fish recaptured.

Tags	Month of recapture												Total
	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23	24-26	27-29	30-32	?	
Unflagged	3	8	13	6	4	6	5	1	1	3	1	14	65
Flagged	16	10	8	6	3	6	3	-	1	4	1	11	69

Table 3. 1956 Lofoten releases.

Numbers of fish recaptured.

Tags	Year of recapture				
	1	2	3	?	Total
Unflagged	208	30	2	6	246
Flagged	217	28	6	9	260

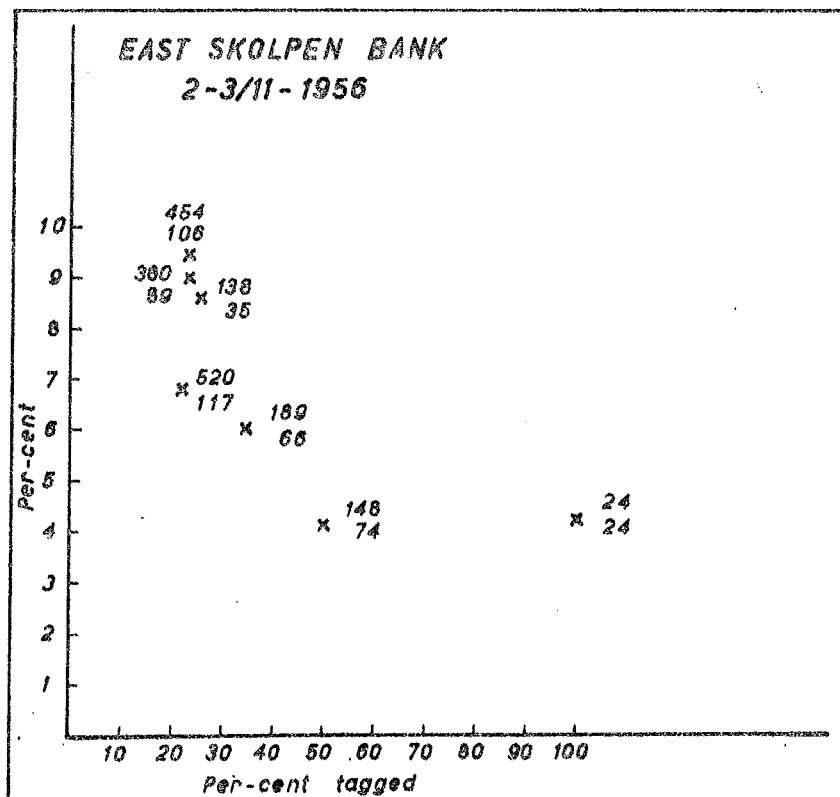


Figure 1. The per cent of recoveries per haul is plotted against the per cent tagged in each haul.

Out of the two number mentioned, the higher one of each haul represents the total numbers of the catch and the other, the total numbers tagged.

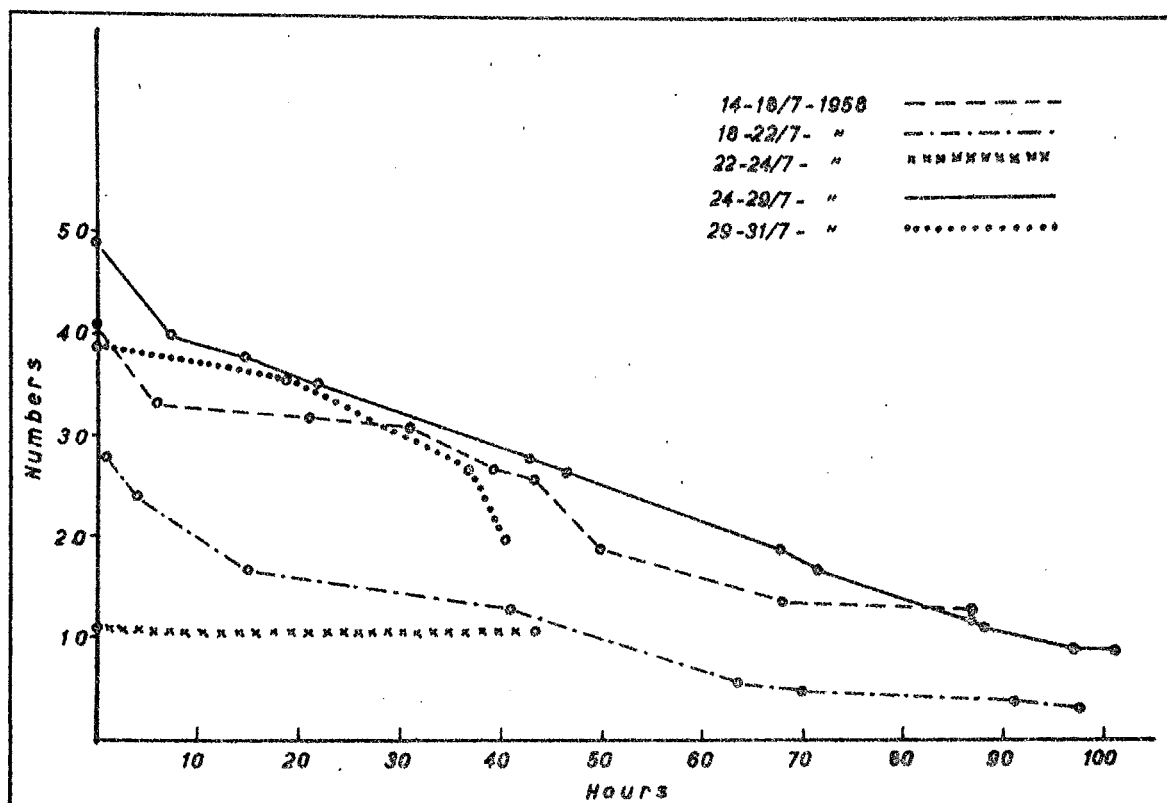


Figure 2. Total numbers of living cod in the tagging tank during the experiments.